

The Giant Next Door: Middle Bakken Member, SE Saskatchewan

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ABSTRACT

The Bakken Formation Play is catching on like a prairie fire across the Williston Basin. The USGS estimates there could be 413 billion barrels of oil-in-place in the Bakken of which 100 billion barrels could reside in Saskatchewan. Based on hydrogeologic and petroleum systems analysis, the middle Bakken sandstone and siltstone member hosts three distinct play types:

- Overpressured low perm/porosity within mature source rock (Overpressure Play)
- Normal Pressure low perm/ porosity within mature source rock (Transitional Play)
- Normal Pressure moderate perm/porosity outside mature source rock (Migrated Play)

All of the discoveries in SE Saskatchewan fall into the normal pressure, “Migrated Play” type.

Detailed core examination in SE Saskatchewan has allowed the subdivision of the middle Bakken Member into 7 unique facies. Two of these (BF4, BF5) are composed of sandstones, siltstones and occasional oolitic beds, deposited in a high-energy, upper shoreface environment. These units have relatively high porosity and permeability characteristics and form regional aquifer systems that require conventional traps for oil accumulations to occur.

Facies BF2 is a high gamma – low resistivity dolomitic siltstone deposited in a lower shoreface environment. Historically this unit was by-passed as a viable reservoir until drilling and completion technology unlocked its potential.

Petrophysical analysis of BF2 requires adjustments for radioactive minerals and pyrite content to accurately identify lithology, porosity and fluid saturations.

The distribution of the unit is controlled by deposition and subsequent erosion. An updip pinchout of BF2 forms a giant stratigraphic trap that was subsequently filled by a focused migration path from the downdip “Transitional Play” area.

The play has all the characteristics of an unconventional resource play, and may prove to be the largest discovery of light sweet oil in SE Saskatchewan.

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